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CLAIM AMENDMENTS

- 1. (currently amended) A method of measuring a wall
 thickness of a pipe in a pipe rolling line, comprising the steps
 of:
- (a) launching an ultrasonic pulse into a wall of a pipe
 whereby an ultrasonic wave is transmitted across a thickness of
 said wall and an ultrasonic echo is returned to a surface of the
 pipe;
 - (b) training a laser beam from an illuminating laser onto said surface whereby a laser-light reflection from said surface is modulated by said echo;
 - (c) collecting laser light reflected from said surface and modulated by said echo as an input optical signal and feeding said input optical signal to a Fabry-Pérot interferometer having two mirrors spaced apart by a predeterminable distance (a), said Fabry-Pérot interferometer having an output optical signal;
 - (d) passing said output optical signal to a <u>first</u> photodiode and converting said output optical signal into an electrical signal and evaluating said electrical signal to determine transit time for echoes spanning the thickness of said pipe and, from said transit time and a speed of sound in material of the pipe, said wall thickness;
 - (e) at least one of the steps of:
 - (e₁) deriving a photodiode-measurement control signal from said electrical signal,

25	(e2) deriving a input-measurement control signal
26	from said input optical signal, and
27	(e ₃) deriving a rolling-line control signal
28	representing a fabrication process variable;
29	(f) controlling a linear actuator determining a position
30	of at least one of said mirrors directly or indirectly through a
31	controller for said linear actuator with at least one of said
32	control signals; [[and]]
33	(g) regulating said photodiode with the output from a
34	variable amplification amplifier; and
35	(h) during steps (e), (f), and (g)
36	(h ₁) varying a signal measured by said first
37	photodiode as a function of the input optical
38	signal as measured by a second photodiode and
39	feeding the varied signal to said controller,
40	each of said first and second photodiodes
41	having respective amplifiers for amplifying the
42	signals measured thereby, and
43	(h ₂) controlling the amplifiers in a respective
44	control circuit based upon at least one
45	predeterminable command variable.

2. (canceled)

3. (currently amended) The method defined in claim [[2]] 1 wherein the amplification of said amplifiers is controlled

- in dependence upon a signal from said second photodiode in said
- respective control circuit in response to one of said command
- variables [[(FR)]].
- 4. (currently amended) The method defined in claim
- [[2]] 1 wherein a signal from said first photodiode is varied in
- dependence upon a measured temperature of said pipe before it is
- fed to said controller.
- 5. (currently amended) The method defined in claim
- [[2]] 1 wherein the amplification of at least one of said
- amplifiers is controlled in dependence upon a disturbance variable
- 4 (z) applied to at least one of said amplifiers through at least one
- s adder.
- 6. (currently amended) The method defined in claim 5
- wherein said disturbance variable (z) is a measured temperature (T)
- of said pipe.
- 7. (original) The method defined in claim 4 wherein
- 2 pipe temperature is measured with a pyrometer.
- 1 8. (currently amended) The method defined in claim
- [[2]] 1 wherein said controller is a high-dynamic regulator acting
- upon said linear actuator.

- 9. (currently amended) The method defined in claim
- [[2]] 1 wherein said controller is a regulator applying PID control
- 3 to said linear actuator.
- 10. (currently amended) The method defined in claim
- [[2]] 1 wherein the control circuits for said amplifiers are
- operated with high dynamic controllers.
- 1 11. (currently amended) The method defined in claim
- [[2]] 1, further comprising applying PID control to at least one of
- said amplifiers.
- 12. (currently amended) The method defined in claim
- [[2]] 1, further comprising applying PI control to at least one of
- said amplifiers.
- 13. (currently amended) The method defined in claim
- [[2]] 1, further comprising the step of defining at least one of
- said command variables by stepwise scanning of a course of
- functional response of the respective control circuit prior to use
- thereof in a wall thickness determination of a rolled pipe.

14. (canceled)

- 15. (currently amended) A device for measuring a wall
- thickness of a pipe in a pipe rolling line, the device comprising:

3	a laser ultrasonic measuring unit having an excitation
4	laser trained on a surface of a pipe for launching an ultrasonic
5	pulse into a wall of the pipe whereby an ultrasonic wave is
6	transmitted across a thickness of said wall and an ultrasonic echo
7	is returned to the surface of the pipe, an illuminating laser
8	directing a laser beam onto said surface whereby a laser-light
9	reflection from said surface is modulated by said echo, and an
L O	interferometer receiving laser light reflected from said surface
.1	and modulated by said echo as an input optical signal and having
L 2	two mirrors spaced apart by a predeterminable distance (a), said
13	interferometer having an output optical signal evaluatable to
14	determine transit time for echoes spanning the thickness of said
15	pipe and, from said transit time and a speed of sound in material
16	of the pipe, said wall thickness, said interferometer having a
L 7 ·	linear actuator for relatively displacing said mirrors to adjust
L8	said distance; and
L9	a control system acting upon said linear actuator and
20	including:
21	a first photodiode receiving said output optical
22	signal,
23	a controller responsive to a signal obtained from
24	said first photodiode and controlling said
25	linear actuator, and
26	a second photodiode receiving said input optical
27	signal.

respective amplifiers connected to said photodiodes
for amplifying respective signals measured
thereby, and
a control circuit including a further controller for
regulating amplifications of said amplifiers to
predetermined values.

- 1 16. (original) The device defined in claim 15 wherein 2 at least one of said amplifiers is connected to an adder for 3 introducing a disturbance parameter as a control factor for the 4 respective amplifier.
- 17. (original) The device defined in claim 15, further
 2 comprising a pyrometer for measuring the temperature of said pipe
 3 and providing an input to at least one of said controllers.
- 1 18. (original) The device defined in claim 15 wherein at least one of said amplifiers has a logarithmic characteristic.
- 19. (currently amended) The device defined in claim 15

 wherein said circuit includes a tolerance former for determining a

 difference between the measured signal of said <u>first photodiode and</u>

 the measured signal of said second photodiode photodiodes and

 feeding a difference signal to the controller responsive to the

 signal obtained from said first photodiode.

- 20. (original) The device defined in claim 15, further comprising a vibration-damped support for said interferometer.
- 21. (original) The device defined in claim 20 wherein said support has vibration-absorbing feet on a bottom side thereof.
- 22. (original) The device defined in claim 21 wherein said support has an enclosure for said interferometer enclosing said interferometer from all sides.
- 23. (original) The device defined in claim 22 wherein said enclosure is composed of wood.
- 24. (original) The device defined in claim 22 wherein said support is provided on inner sides with plate-shaped damping elements.
- 25. (original) The device defined in claim 24 wherein said damping elements are fibers of medium density.
- 26. (original) The device defined in claim 24, further comprising a foam between said plate-shaped damping elements and inner sides of said support.